

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference MJB07267WO	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, item 5 below.	
International application No. PCT/GB2004/001526	International filing date (day/month/year) 07/04/2004	(Earliest) Priority Date (day/month/year) 09/04/2003
Applicant THE TECHNOLOGY PARTNERSHIP PLC		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 4 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).



With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2.



Certain claims were found unsearchable (See Box II).

3.



Unity of invention is lacking (see Box III).

4. With regard to the **title**,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regards to the **drawings**,

- a. the figure of the **drawings** to be published with the abstract is Figure No. 9



as suggested by the applicant.



as selected by this Authority, because the applicant failed to suggest a figure.



as selected by this Authority, because this figure better characterizes the invention.



none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB2004/001526

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 F04B45/047 F04B43/04 F04F7/00 F04B43/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 F04B F04F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 525 041 A (DEAK DAVID) 11 June 1996 (1996-06-11) abstract column 9, line 30 - column 10, line 45 column 12, line 33 - column 13, line 11 figures 1,5	1,4
A	US 6 164 933 A (MASAKI YASUFUMI ET AL) 26 December 2000 (2000-12-26) abstract column 4, line 34 - line 57 column 8, line 66 - column 9, line 5 figures 4,18,19 ----- -/-	1,3,4

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

G document member of the same patent family

Date of the actual completion of the international search

2 July 2004

Date of mailing of the international search report

09/07/2004

Name and mailing address of the ISA

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Authorized officer

Kolby, L

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB2004/001526

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 93/10910 A (TECHNOLOGY PARTNERSHIP) 10 June 1993 (1993-06-10) cited in the application abstract page 13, line 7 - page 15, line 13 figures 1-5	1,2,4,6
A	----- DE 44 22 743 A (GERLACH TORSTEN) 4 January 1996 (1996-01-04) abstract column 2, line 60 - column 4, line 26 column 4, line 63 - column 5, line 6 figures 1-3,7 -----	1,2,4

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB2004/001526

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5525041	A	11-06-1996	US 5982801 A	09-11-1999
US 6164933	A	26-12-2000	JP 11311184 A	09-11-1999
			JP 2000171320 A	23-06-2000
			DE 19918694 A1	04-11-1999
			DE 29924151 U1	11-04-2002
WO 9310910	A	10-06-1993	AT 131421 T	15-12-1995
			AU 665222 B2	21-12-1995
			AU 3090292 A	28-06-1993
			DE 69206824 D1	25-01-1996
			DE 69206824 T2	23-05-1996
			EP 0615470 A1	21-09-1994
			WO 9310910 A1	10-06-1993
			JP 2849647 B2	20-01-1999
			JP 7501481 T	16-02-1995
			US 5518179 A	21-05-1996
DE 4422743	A	04-01-1996	DE 4422743 A1	04-01-1996
			WO 9600849 A1	11-01-1996

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/GB2004/001526

International filing date (day/month/year)
07.04.2004

Priority date (day/month/year)
09.04.2003

International Patent Classification (IPC) or both national classification and IPC
F04B45/047, F04B43/04, F04F7/00, F04B43/00

Applicant
THE TECHNOLOGY PARTNERSHIP PLC

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITYInternational application No.
PCT/GB2004/001526**10/ 551 788****Box No. I Basis of the opinion**

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. II Priority

1. ☒ The following document has not been furnished:
- ☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).
 - ☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).
- Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.
2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-11
	No: Claims	
Inventive step (IS)	Yes: Claims	1-11
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-11
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V.

- 1 The following documents are referred to in this communication:
D1 : US 5 525 041 A (DEAK DAVID) 11 June 1996 (1996-06-11)
D2 : US 6 164 933 A (MASAKI YASUFUMI ET AL) 26 December 2000 (2000-12-26)

- 2 Document D1, which is considered to represent the most relevant state of the art, discloses (the references in parenthesis applying to this document) (see fig. 1):
A gas flow generator comprising:
an ultrasonic driver comprising a piezoelectric transducer (8)
mounted on a substrate (10), operation of the transducer (8) being arranged to

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a coating/membrane (10) being formed integrally with the substrate (10)

From this, the subject-matter of independent claim 1 differs essentially in that:
a second membrane is mounted substantially parallel with the driver and spaced a given distance therefrom; and one of the membranes being perforate.

- 2.1 The subject-matter of claim 1 is therefore novel (Article 33(2) PCT)
The problem to be solved by the present invention may be regarded as:
providing an efficient small size (low profile), light weight gas flow generator (see page 1, line 13 and line 21-23).

2.2 The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) as the solution is not rendered obvious by the document D1 or by the document D2 (see §2.3) nor by a combination of these documents or any other prior art designs, since the state of the art does not offer any hints towards this solution.

2.3 Another gas flow generator is disclosed in the Document D2, which discloses (the references in parenthesis applying to this document) (see figures 4, 18 and 19): A gas flow generator comprising:
two parallel piezoelectric driven membranes (20E) where operation of the piezoelectric electrodes (21,22) mounted on opposite faces of the membranes (20E) being arranged to cause the membranes (20E) to bend.

From this, the subject-matter of independent claim 1 differs essentially in that: the driver is ultrasonic and in particular in that one of the membranes being perforate, whereby the use of separate valves are not required.

Also if starting from this document, the skilled person would not arrive at a gas flow generator according to claim 1.

2.3 Claims 2-11 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

3 The invention is industrial applicable in the field of gas flow generators/pumps (Article 33(4) PCT).